| | Application No. | Applicant(s) |
|---|---|---|
| ***Notice of Allowability*** | 09/765,516 | CHUGG ET AL. |
| | Examiner | Art Unit | |
| | Jason M. Perilla | 2611 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--*

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the amendment filed December 2, 2005*.

2. ☒ The allowed claim(s) is/are *1-19*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All    b)☐ Some*    c)☐ None   of the:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached

      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

    Paper No./Mail Date _____ .

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)

6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20060417* .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

## EXAMINER'S AMENDMENT

1.      Claims 1-19 are pending in the instant application.

2.      An examiner's amendment to the record appears below. Should the changes

and/or additions be unacceptable to applicant, an amendment may be filed as provided

by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be

submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview

with Joseph Juliano on April 17, 2006.

The application has been amended as follows wherein the following versions of

claims 1, 5, 6, and 17-19 are replace all prior versions in their entirety:

1.      A system for estimating inputs and outputs of a digital transmission system, comprising:
a receiver front-end configured to receive a digital signal in the digital transmission system as an observed digital signal;
a forward recursion element adapted to receive the observed digital signal, and generate a first sequence of soft information by performing a forward recursion;
at least one forward channel estimator adapted to receive the observed digital signal and said first sequence of soft information, said at least one forward channel estimator operating to estimate forward channel parameters using said first sequence of soft information;
a backward recursion element adapted to receive the observed digital signal, and generate a second sequence of soft information by performing a backward recursion;
at least one backward channel estimator adapted to receive the observed digital signal and said second sequence of soft information, said at least one backward channel estimator operating to estimate backward channel parameters using said second sequence of soft information; and
a combiner configured to compute a transitional information that binds the forward channel parameter estimates with the backward channel parameter estimates, said combiner operating to generate soft information for of the digital transmission system by combining said first and second sequences of soft information and said transitional information.

5.      The system of claim 4, wherein each of said min/sum operators computes soft ~~output for inputs and~~ outputs defined by Trellis state transition~~s~~.

6.      The system of claim 5, wherein said soft outputs ~~for the inputs and outputs~~ defined by Trellis state transition~~s~~ are computed by min/sum operations of a starting state forward soft information, said Trellis state transition, an ending state backward soft information, and a binding factor.

17.     An iterative receiver system, comprising:

a channel processor configured to receive a plurality of coded symbols, said channel processor operating to produce and update soft information on said plurality of coded symbols, where said channel processor is activated by soft information, updated by other soft-input/soft-output modules, on interleaved code symbols and wherein said channel processor operating to produce and update soft information ~~comprises~~ performs the steps of:

generating a first sequence of soft information by performing a forward recursion on said plurality of coded symbols,

estimating forward channel parameters using said first sequence of soft information and said plurality of coded symbols,

generating a second sequence of soft information by performing a backward recursion on said plurality of coded symbols,

estimating backward channel parameters using said second sequence of soft information and said plurality of coded symbols,

computing a transitional information that binds the forward channel parameter estimates with the backward channel parameter estimates, and

generating soft information on said plurality of coded symbols by combining said first and second sequences of soft information and said transitional information~~;~~

~~a soft-in/soft-out decoder configured to receive said soft-information on said plurality of coded symbols, said soft-in/soft-out decoder operating to compute soft information on said plurality of coded symbols; and~~

~~an interleaver/de-interleaver pair operating to pass said soft information to/from said channel processor from/to said soft-in/soft-out decoder,~~

~~where after several iterations, final bit decisions are made on uncoded bits by said soft-in/soft-out decoder by thresholding the corresponding soft information produced by said soft-in/soft-out decoder.~~

18.     The system of claim 1, wherein said combiner configured to compute a said transitional information that ~~ties said first and second sequences of soft information together~~ binds the forward

channel parameter estimates with the backward channel parameter estimates comprises said combiner configured to compute a said transitional information that binds said first and second sequences of soft information and said forward and backward channel parameter estimates ~~ties said first and second sequences of soft information and forward and backward channel estimates together~~.

19.     The system of claim 1, wherein said combiner operating to generate soft information ~~of~~ for the digital transmission system comprises said combiner operating to generate soft information on the inputs and outputs of the digital transmission system.

## *Allowable Subject Matter*

3.     Clams 1-19 are allowed.

4.     The following is an examiner's statement of reasons for allowance:

Claims 1-19 are allowed because the prior art of record does not disclose or obviate a recursion estimator wherein each of the forward and backward recursion elements as well as the forward and backward channel estimators each receive as input an observed digital input signal.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."
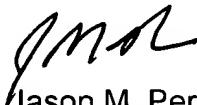
## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
April 17, 2006

jmp

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER